

### WHAT IS CLAIMED IS:

1. A digitally modulated power control device, comprising:
  - an input unit for inputting an AC voltage signal and a control signal;
  - a signal detection unit for detecting the AC voltage signal and the
  - 5 frequency thereof, and further generating a first trigger signal based on the AC voltage signal;
  - a control unit for receiving the control signal and the first trigger signal, and further processing the first trigger signal based on the control signal in order to generate a second trigger signal; and
  - 10 an output unit having an AC switching unit; wherein the output unit being operative to receive the second trigger signal for activating the AC switching unit and outputting an adjusted AC voltage signal for adjusting an output power of the AC load.
2. The power control device as claimed in claim 1, wherein the control
- 15 unit comprises a control signal processing unit, a power adjustment unit, and a second trigger signal generation unit, the control signal processing unit being operative to receive the control signal and the first trigger signal for processing the same, controlling the second trigger signal generation unit via the power adjustment unit, and outputting the second trigger signal.
- 20 3. The power control device as claimed in claim 2, wherein the power adjustment unit comprises a plurality of segments cyclic control unit and a segment-less fine adjustment unit, the plurality of segments cyclic control unit being operative to control the second trigger signal generation unit to generate a segmental control second trigger signal, and the segment-less

fine adjustment unit being operative to control the second trigger signal generation unit to generate a linear control second trigger signal.

4. The power control device as claimed in claim 1, wherein the input unit comprises an AC source input socket and a control signal input unit.

5 5. The power control device as claimed in claim 4, wherein the control signal input unit is either a touch panel or a set of keys and a radio frequency module.

6. The power control device as claimed in claim 1, wherein the signal detection unit is a zero crossing detector (ZCD) for generating a first trigger  
10 signal taken as a zero crossing signal.

7. The power control device as claimed in claim 1, further comprising a timer unit, a status control unit, and a plurality of light emitting diodes (LEDs) for displaying a control status of the control unit.

8. The power control device as claimed in claim 1, wherein the AC  
15 switching unit is a tri-electrode AC switch (TRIAC).

9. The power control device as claimed in claim 1, wherein the second trigger signal is a pulse position modulation (PPM) signal.

10. The power control device as claimed in claim 1, wherein the AC load is either a resistive load or an inductive load.

20 11. The power control device as claimed in claim 1, wherein the AC load is a single phase AC motor, fan, hair dryer, electric heater, or incandescent lamp.